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RELATIONSHIP AMONG SERIAL CORONARY ARTERIAL REMODELING, STENOSIS PROGRESSION, AND PLAQUE COMPOSITION: A VH-IVUS TISSUE CHARACTERIZATION ANALYSIS

i2 Poster Contributions
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Background: We studied the relationship among serial remodeling, plaque composition, lesion phenotype, and stenosis progression.

Methods: Of 990 pts who were enrolled in a prospective, 42 center, nonrandomized, global virtual histology intravascular ultrasound (VH-IVUS) registry, we identified 99 pts with serial (baseline and follow-up @ 11±5 mos) VH-IVUS with 224 non-culprit, untreated lesions (plaque burden ≥30% in at least 3 consecutive frames. The 4 VH-IVUS plaque components were color-coded as dense calcium (DC), necrotic core (NC), fibrofatty (FF), and fibrotic tissue (FT) and reported as percentages of plaque area and total plaque volume. We classified lesions into 5 phenotypes: pathological intimal thickening (PIT), thin cap fibroatheroma (TCFA), Thick cap fibroatheroma (ThFA), Fibrotic (F), Fibrocalcific (FC).

Results: At the minimum luminal site, remodeling (ΔEEM) correlated with Δlumen ($p<0.001$), Δplaque overall ($p<0.001$), and ΔFF ($p<0.001$) and ΔFT ($p=0.001$), but not with ΔNC ($p=0.321$) or ΔDC ($p=0.417$). When assessed by lesion subtypes, plaque increased significantly in PIT ($p<0.001$), TCFA ($p=0.016$), and ThCFA ($p<0.001$), but not in fibrotic or fibrocalcific plaque. Lumen area decreased significantly in PIT ($p<0.001$), TCFA ($p=0.006$), and ThCFA ($p<0.001$), but not in fibrotic or fibrocalcific plaque. However, EEM area did not change significantly from index to follow-up in any lesion subtype; and ΔEEM was similar among the 5 subtypes: 0.1±1.3 mm2 in PIT, -0.2±0.8 mm2 in TCFA, 0.1±1.1 mm2 in ThFA, -0.1±1.5 mm2 in F, -0.2±1.0 mm2 in FC ($p=0.623$). Finally, there was no significant correlation between ΔEEM and baseline plaque composition.

Conclusions: Serial remodeling correlates with plaque progression and influences stenosis progression (lumen compromise), but is not related to VH-IVUS lesion phenotype or to the change in necrotic core. However, VH-IVUS phenotypes do predict stenosis stability independent of serial remodeling; PIT, TCFA, and ThCFA are associated with plaque progression and increasing lumen compromise while fibrotic and fibrocalcific plaques are stable and do not progress.